UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
LIN, JERRY

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>19 November 2007</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>*16-24 and 26*</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>*16-24 and 26*</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>*06 February 2004*</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

1.   Applicants' arguments, filed November 11, 2007, have been fully considered and

they are not deemed to be persuasive. The following are either reiterated. They

constitute the complete set presently being applied to the instant application.

Status of the Claims

Claims 16-24 and 26 are under examination.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

Claims 16-24 and 26 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

3.   Claims 16, 20, 22, 23, 24, and 33 recite the limitation of "regularly shaped

region." It is unclear what this term means. The Specification does not define this term.

The Merriam-Webster Online Dictionary defines a regular shape as a shape that is both

equilateral and equiangular. However, the instant specification and claim 24 state that a

regular shape may be disk-shaped or ellipsoid. These embodiments appear to

contradict with the commonly accepted definition of "regular". It is recognized that

applicant may be his own lexicographer; however, the instant specification does not

supply any particular definition for the term "regularly shaped region." As the term

appear to be directed to shapes other than those which fall within the commonly

accepted definition, and the instant specification fails to set forth any other definition, the

use of the term "regularly shaped region" renders the claim indefinite. Clarification via

clearer claim language is required.

Response to Arguments

4.   Applicants have responded to this rejection by first stating that the specification

at page 17, lines 10-22 define the term "regularly shaped." However, the cited

paragraph does not explicitly define a regularly shaped region, rather teaches different

properties of a regular shape, such as high symmetry and the capability to be easily

described mathematically and/or algorithmically. While the examiner agrees that these

are properties of regularly shaped regions, the cited paragraph does not provide a

definition of regularly shaped regions.

Applicants also provided a definition from the Connexions web site that states,

"The geometry of regularly shaped bodies are defined by mathematical equations."

However, as in the specification, the Connexions web site is defining a property of a

regularly shaped body, not the definition of regularly shaped body.

Applicants also state that they could not find the Examiner's Definition in the

Merriam-Webster Online Dictionary. A copy of the Definition was mailed with the

previous office action. Another copy accompanies this office action. In addition, the

web address for the definition is http://www.m-w.com/dictionary/regular. Furthermore, a

copy of the definition sent with the previously sent office action may be viewed in

Private PAIR. The relevant definition is, "both equilateral and equiangular < a *regular polygon>*."

Applicants also suggested that the Examiner consult the Wolfram Dictionary or some other scientific dictionary. However, upon searching the Wolfram Dictionary, the Examiner did not find a definition of regular shape, although the Examiner did find the definition of a regular polygon. The Examiner also consulted The American Heritage Dictionary of Science which defines regular as "having all its angles equal and all of its sides equal: *a regular polygon*." A copy of the definition is provided with this office action.

It is clear from the Merriam Webster Dictionary and The American Heritage Dictionary of Science that a regular shape is a shape that is equilateral and equiangular. Circles, disks or ellipsoids are not regular shapes. However, the specification and claims appear to contradict the well accepted definition of "regular" as it pertains to geometry. Thus, the instant claims are indefinite.

This rejection is maintained from the previous office action.

Claim Rejections - 35 USC § 101

5.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6.   Claims 16-24 and 26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The instant claims are drawn to a process involving the judicial exception of a computational algorithm. Claims drawn to a judicial exception is non-statutory unless the claims include a practical application of that judicial exception as evidenced by a physical transformation of the claimed invention, or if the claimed invention produces a useful, tangible and concrete final result. In the instant claims, there is no physical transformation by the claimed invention, thus the Examiner must determine if the instant claims produce a useful, tangible, and concrete final result. See MPEP 2106.

The instant claims do not produce a useful, concrete, and tangible final result. A useful, concrete, and tangible final result requirement requires that the claim must set forth a practical application of the mathematical algorithm to produce a real-world result. While the instant claims do render the microarray for visual display and displays the microarray data, these results are intermediate results and are not <u>final</u> results. After displaying the microarray data, the program continues other processing steps. As written, a result from the processing steps is not present in the claims, nor does a result necessarily flow from the processing steps. Thus the instant claims do not require that a result must be produced. Since there is no final result in the claims, the instant claims do not include a useful, concrete, and tangible final result. This rejection could be overcome by amendment of the claims to identify/recite a concrete result and to recite that the result is outputted to a display or to a user or outputted in a user readable format. However, applicant is reminded that any amendment must be fully supported and enabled by the originally filed disclosure.

<u>Response to Arguments</u>

7.   Applicants first state because their system requires a processor and display

device, that the instant claims are not drawn to a computational algorithm. The

Examiner disagrees. The method steps carried out by the program are clearly drawn to

a computational algorithm (i.e. a method of computationally manipulating microarray

data). Merely embodying the method steps on a program which is embodied on a

processor and display device does not exempt the method steps from requirement for a

computational algorithm to have a practical application which is found through

determining if the instant claims have useful, tangible, and concrete final result. As

explained above, the claims do not have a useful, concrete and tangible final result.

        Applicants also appear to be unclear as to what is an intermediate result versus a

final result. To clarify, the instant claims recite displaying microarray data for visual

display. This step may be seen as a providing a result. However additional processing

steps occur after displaying the microarray data, such as receiving a boundary and

constructing a regularly shaped region. Because additional processing occurs after the

step of displaying the microarray data, the step of the microarray data is not the final

result of all the process steps. Thus the step of displaying the microarray data is an

intermediate result. As explained above, a practical application requires a useful,

tangible, and concrete final result. However, the instant claims do not recite a final

result, and thus cannot have a useful, tangible, and concrete final result.

        This rejection is maintained from the previous office action.

Claim Rejections - 35 USC § 102

8.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9.   Claims 16-24 and 26 are rejected under 35 U.S.C. 102(a) as being anticipated by

Bozinov (IEEE Transaction on NanoBioscience (2003) Vol. 2, Number 4, pages 215-

220).

The instant claims are drawn to a system that includes a processor, stored data,

a displace? device, a user input device, and a program that renders and displays the

data for visual display, receives a boundary of a region of feature extractability within

the microarray, and constructs a regularly shaped region for feature extractability from

the received boundary of the region of feature extractability within the microarray.

Regarding claims 16 and 26, Bozinov teaches a software system, which would

require a process, stored microarray data, and a display device and user input device

(abstract), with a program that renders and displays the microarray data for visual

display (page 217, Figure 1; page 219, Figure 5), receives a boundary of a region of

feature extractability within the microarray (pages 218-219), and constructs regularly

shaped region of feature extractability from the received boundary of the region of

feature extractability (pages 218-219).

Regarding claims 17 and 18, Bozinov's software system also renders and displays images of the microarray with indications of putative (i.e. existing) feature positions (page 217, Figure 1; page 219, Figure 5).

Regarding claim 19, Bozinov's software system also teaches receiving a contour line enclosing the region of feature extractability (page 219).

Regarding claim 20, Bozinov's software system employs nearest neighbor analysis (i.e., direct neighbor search) to generate a binary mask with binary values and determining a regularly shaped region of feature extractability (page 218-219).

Regarding claim 21, Bozinov's software system employs a nearest neighbor analysis wherein if the nearest neighbor intensity value is greater than a computed average intensity, the binary value assigned to a pixel indicates it is a region of feature extractability, whereas if the nearest neighbor intensity value is less than a computed average intensity, the binary value assigned to a pixel indicates it is not a region of feature extractability (page 218, left column).

Regarding claims 22 and 23, Bozinov teaches computing the size of the regularly shaped region of the feature extractability and positioning the regularly shaped region of feature extractability so the geometric center coincides with the center of mass (page 218) and wherein the majority of pixels with corresponding binary-mask values are included in the regularly shaped region (page 218).

Regarding claim 24, Bozinov teaches wherein the region is a rectangular region (page 218, Figure 3; page 219, figure 4).

Response to Arguments

10.   Applicants first respond to this rejection by stating that Bozinov does not teach "a

boundary of a region of feature extractability," which the specification describes as a

user manually drawing a contour line over a visually displayed image of a microarray.

The Examiner agrees that Bozinov does not teach a user manually drawing a contour

line over a visually displayed image of a microarray as recited in the specification.

However, this is only one embodiment of the claims. The limitation of "receives a

boundary of a region of feature extractability" is not limited to only manually drawing a

contour line. Instead the boundary of a region may be received from another program,

device, database, etc. Thus, Bozinov automated process of drawing boundaries is

within the scope of the claims.

        Applicants also state that Bozinov's classification of pixels, rows, and columns

within a microarray image as foreground or background has nothing to do with feature

extractability. The Examiner disagrees. Determining which pixels are foreground or

background allows the user to determine which pixels are part of the feature or which

are noise. Thus, by determining the foreground, the region of feature extractability is

also found. Applicants also point to the specification beginning at page 14, line 24 that

discusses reason why portions of a microarray are unsuitable for feature extractability

as well as examples of feature extractability. However, while the specification may

contain particular embodiments of the claims, the Examiner cannot import limitations

from the specification into the claims and cannot use imported limitations to distinguish

the claims form the prior art.

This rejection is maintained from the previous office action.

Conclusion

No claim is allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jerry Lin whose telephone number is (571) 272-2561.

The examiner can normally be reached on 10:00-6:30, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Marjorie A. Moran can be reached on (571) 272-0720. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JL/

/Marjorie A. Moran/
SPE, AU 1631
2/4/2008